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Socioeconomic Status and Health Care Utilization: A Study of the Effects of Low Income, Unemployment and Hours of Work on the Demand for Health Care in the E.U.

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Socioeconomic Status and Health Care Utilization: A Study of the Effects of Low Income, Unemployment and Hours of Work on the Demand for Health Care in the E.U.

Athina Economou[*], Agelike Nikolaou[*], Ioannis Theodossiou[**]

Abstract: The purpose of this study is to shed light on the individual socio-economic status (SES) and demographic determinants of the demand for health care in a cross-comparison study of nine E.U. countries. It focuses on the effects of the individual employment status on alternative indicators of demand for health care that constitutes a largely unexplored area. The evidence supports the existence of an employment status- demand for health care relationship although it varies with respect to the type of health care examined and the institutional and environmental settings of the countries utilised in the study.

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Keywords: Demand for health care, inpatient nights, doctor visits, panel data

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[*] Department of Economics, University of Macedonia, Greece.

[**] Centre for European Labour Market Research, University of Aberdeen Business School, Economics, University of Aberdeen, UK.

[+] Corresponding author: Ioannis Theodossiou, tel.: +44-1224-272183; fax: +44-1224-272181; email: theod@abdn.ac.uk.

1. Introduction

Equity in access to health care has become an important issue for policy makers (Wagstaff and Van Doorslaer, 2000). The policy objective is to achieve adequate access to health care by all individuals based on their needs and provision of health care that is independent from individual SES status (Andersen, 1995; Gerdtham, 1997, Van Der Heyden et al. (2003)). Andersen (1995) points out that equitable health care utilisation exists only when there is a correlation of health care provision with indicators of need but not with economic indicators, such as income and employment status.

In Grossman (1972) the demand for medical services is a function of individuals' own health status, age, the wage rate, a price vector of medical services, a vector of environmental effects, and the level of education. His main predictions indicate that the demand for health care increases with age and with the wage rate. In contrast, a negative relationship between education and demand for health care is expected as long as education leads to a more efficient production of health capital. In his model he imposed a time constraint on the production of health capital, based on the assumption that the total amount of the available time to the individual in any period of time is allocated between (i) the hours of work, (ii) the time lost from market and non market activities due to bad health, (iii) the health investing activities, and (iv) the time spent for the production of other commodities. He considers these time alternatives as substitutes and argues that the individual's "stock of health determines the total amount of time he can spend producing money earnings and commodities. Since both market time and non market time are relevant, even individuals who are not in the labour force have an incentive to invest in their health"[1].

Dustmann and Windmeijer (2000) developed a life cycle model for the demand of health, based on the hypothesis that individuals produce health capital through a combination of time and health services. They argue that the intertemporal wage profile of the individual is a substitute to investment in health capital, since the time engaged into labour market activities "competes" with the time spent for the production of health. In Andersen (1968) the demand for medical services crucially

[1] Grossman, 1972, p. 234.

depend on variables that predispose utilisation such as age, gender, and household composition, variables that enable utilisation such as income and education and need variables namely the health status indicators. This model has been criticised for obscuring the role of psychological distress, locus of control, and social support. Thus Andersen (1995) developed it further to incorporate both supply and demand factors in the individual use of health care services function.

A detailed review of the literature is beyond the scope of this study but a number of some key studies are reviewed below in order to obtain a flavour of this literature. Different components of individual SES were found to affect alternative types of health care utilisation in different ways (Van Doorslaer et al., 2004). For example, demand for hospital services are explained by need and demographic characteristics, since these services are demanded in the case of relatively severe health conditions. On the contrary, demand for health care services optional in nature which are based on the individual's priorities, such as visits to the dentist, are mainly explained by social and enabling factors (Andersen, 1995).

Applied research provides evidence of a horizontal inequity based on individual SES status even in the case of hospital services (Van der Heyden et al., 2003). Income level is found to be the most powerful predictor of area hospital utilisation rates (Billings et al., 1993). Those in the lowest income quintile who are older, in low health state, who suffer greater hospitalisation risks, and who have a lower probability of insurance appear to consume the greatest share of public expenditures in hospitals (Schofield, 2000). Evidence of horizontal inequity based on education, income, ethnicity, and employment status are also found for inpatient admissions in the UK (Gravelle et al., 2003). However, health status indicators appear to be more important determinants of health care utilisation in comparison to demographic and SES characteristics (Coulton and Frost, 1982; Cameron et al., 1998).

The educational level and income are two important components of individual SES that affect health care utilisation (Deb, 2001, Van der Heyden et al., 2003). It is shown that higher education is associated with better self-reported health status and higher income (Fernández-Olano et al., 2005). However, Van Doorslaer et al. (2004) finds that, after adjusting for need differences, there appears to be little evidence of a

relationship between income inequity and the probability of visiting a general practitioner.

Males appear to have a lower Health care utilisation rates than females (Schofield, 1996; Windmeijer and Santos Silva, 1997; Cameron et al., 1998; Winkelmann, 2004). Age-demand for health care relationship appears to be a quadratic relationship (Windmeijer and Santos Silva, 1997; Cameron et al., 1998, Pohlmeier and Ulrich, 1995; Cameron et al., 1998; Deb, 2001; Winkelmann, 2004). However, Jochmann and León-González (2004) find a concave pattern between age and the number of doctor visits with the maximum appearing at about 85 years of age. Finally, Coulton and Frost (1982) argue that the same factors which affect health care utilisation of the adult population persist for the elderly.

On important issue that is highlighted in the literature is the health care utilization process. In particular, it is argued that the demand for health care is not determined solely by the individual. The individual is responsible for the decision to first contact the health care provider, namely the doctor, but the amount of the medical service he or she will receive is determined to a significant degree by the physician. This implies that the decision making process of health care utilisation consists of two distinct stochastic processes; the first contact decision which is initiated by the patient (decision process) and the intensity of treatment which is significantly influenced by the doctor (frequency process) (Pohlmeier and Ulrich, 1995; Winkelmann, 2004). Therefore, the above two processes should be treated separately in the empirical or theoretical research. Yet, Van der Heyden et al. (2003) suggest that patient factors might be more important in explaining the differential use of health services than supply factors.

Using this line of research Pohlmeier and Ulrich (1995) and Winkelmann (2004) show that there are significant differences between the two stages regarding the determinants of health care demand. They find that individual SES characteristics are only significant in explaining the contact decision. Being a male, single, of higher income and education, and having faced unemployment in the past year is associated with a lower number of visits to a general practitioner. Gerdtham (1997) show that there is a positive relationship between income and the individual decision to visit the

physician, but the effect of income does not appear to be significant in the second stage. However, in both stages, need variables are the strongest determinants of health care demand.

All in all, the evidence from the literature suggests that health care utilisation is mainly associated with the need indicators (namely, the individual's health status) whereas the findings with respect to the predisposing variables (such as age, gender, educational level, etc.) and the enabling variables (such as income) are rather controversial (Fernández-Olano et al., 2005).

The aim of the paper is to examine the effects of the individual's SES status on his or her demand for health care. The analysis is based on the determinants of the demand for health care at the individual level, following the approach of Grosmman (1972) and Andersen (1968). It focuses on the effects of unemployment, low income and hours of work on health care utilisation which constitutes a rather under researched area in the literature. In doing so it assumes a two-stage decision process in the health services utilisation since the demand of health care depends on both the individual's decision to demand a certain level of health care and on the decision of the health care provider to offer it. The results are compared to those obtained by a model where the demand for health care is determined solely by the individual. One of the interesting aspects of the dataset used is that it permits comparisons between countries. Hence, the analysis is carried out separately for nine E.U. countries in order to discover possible differences in the utilisation of health care services due to different institutional and environmental settings.

The structure of the paper is as follows: Section 2 provides a description of the dataset, the indicators, and the econometric methodology applied. Section 3 analyses the findings and Section 4 concludes.

2. Methodological framework

The dataset

The dataset is drawn from the eight waves of the European Community Household Panel survey (ECHP). ECHP is a panel survey that starts in 1994. A representative panel of individuals and households participate each year in the survey in fifteen European countries. The survey contains ample information on individual characteristics, such as income, housing, education, health, employment and the like.

The study uses a balanced pooled sample for the years 1994-2001. In the case of the Netherlands the sample is restricted for the years 1994-1997, due to missing information for specific indicators in the remaining years. To obtain a reasonable degree of sample homogeneity only individuals aged over 18 years are included in the sample.

Due to data limitations the study is conducted for nine E.U. countries; Belgium, Denmark, Greece, Ireland, Italy, Netherlands, Portugal, Spain, and the UK. The final sample constitutes of 15944 observations for Belgium, 18280 for Denmark, 39368 for Greece, 17760 for Ireland, 62096 for Italy, 26460 for the Netherlands, 51672 for Portugal, 55856 for Spain, 39640 for the UK. The analysis is carried out separately for each country.

Unfortunately the ECHP does not provide detailed health variables but only two alternative indicators of individual demand for health care services which are used in this study. These are as follows:

(a) The number of inpatient nights, obtained from the question "Number of nights spent in hospital during the past 12 months".
(b) The number of visits to doctors, obtained from the question "Number of times the person has been to a doctor or a dentist or optician, during the past 12 months".

The responses are scaled as follows: 1: "not at all", 2: "1-2 times", 3: "3-5 times", 4: "6-9 times", 5: "10 times or more".

A number of individual demographic (age, gender, marital status, social networks), SES status (income, educational level, employment characteristics) and health status

are controlled for in the analysis. Further details on the definitions the variables used are reported in Table 1.

The main variables of interest are those describing the individual employment status. In the proposed two-step decision process adopted in this study, the first stage concerns the estimations of the effect of the employment status on the demand for health care services. For the second stage of the analysis, the key variable of interest is total hours of work per week.

In line with Grossman (1972) and Dustmann and Windmeijer (2000) for the empirical investigation five relevant dummies are constructed namely whether the individual is working overtime (more than 40 hours per week), full time (30-40 hours per week), part time (less than 30 hours per week); is unemployed and, whether the individual is out of the labour force.

Finally, year and regional dummies for each country are also controlled for in order to account for aggregate changes over time and between different regions respectively. In the case of Denmark and the Netherlands, there is no regional information hence no regional dummies are included in the regressions. The means of the variables are presented in Table 2.

Econometric methodology

The econometric modeling employed in this study is identical across all nine countries to facilitate cross-country comparisons.

In health care utilisation data, such as the number of inpatient nights, a high proportion of individuals report no-utilisation of health care. In such cases, count data regression techniques are used. The negative binomial model is usually preferred in comparison to the Poisson model since it accounts for the excess zeros and the high degree of overdispersion encountered in the data. A random effects approach of the negative binomial model of type 2 is utilised in order to take advantage of the time series element of the dataset. In the negative binomial regression, unobserved heterogeneity is assumed to be gamma distributed. Following Hausman et al. (1984),

it is assumed that the Poisson parameter λ_{it} follows a gamma distribution with parameters (γ_{it}, δ_i). Hence

$$(\gamma_{it}, \delta_i) = (e^{x_{it}\beta}, \phi_i / e^{\mu}), \qquad i = 1,...,N, \qquad t = 1,...,8 \tag{1}$$

with δ_i being the individual-specific random effect which is distributed as a beta random variable across individuals with parameters (a,b) and independently of the regressors x_{it}. Finally, the beta density function of the random-effects negative binomial model for the n_{it} observation is:

$$pr(n_{i1,...,} n_{iT} \left| x_{i1,...,} x_{iT}\right.) = \frac{\Gamma(a+b)\Gamma(a+\sum_T \gamma_{it})\Gamma(b+\sum_T n_{it})}{\Gamma(a)\Gamma(b)\Gamma(a+b+\sum_T \gamma_{it}+\sum_T n_{it})} \prod_t \frac{\Gamma(\gamma_{it}+n_{it})}{\Gamma(\gamma_{it})\Gamma(n_{it}+1)} \tag{2}$$

(Hausman et al. (1984)). The parameters β, a, and b are estimated by maximum likelihood and the coefficients will be consistent if the random effect δ_{it} is independent of the regressors x_{it}.

However, applied researchers argue that the use of single index models such as the Poisson or the negative binomial model may lead to loss of crucial information, whereas the use of two-part or hurdle models offers additional flexibility (Winkelmann, 2004). Hence, to evaluate the robustness of the results a two-part hurdle model is also used. This assumes that the participation decision and the positive count are generated by distinct probability processes $P_1(\bullet)$ and $P_2(\bullet)$ (Jones, 2003). Following Jones (2003) the log-likelihood for the hurdle model is:

$$\begin{aligned} Log\ L &= \sum_{y=0} \log[1 - P_1(y>0\left|x\right.)] + \sum_{y>0} \{\log[P_1(y>0\left|x\right.)] + \{P_2(y\left|x, y>0\right.)]\} = \\ &= \left\{\sum_{y=0} \log[1 - P_1(y>0\left|x\right.)] + \sum_{y>0} \{\log[P_1(y>0\left|x\right.)]\right\} + \left\{\sum_{y>0} \{\log[P_2(y\left|x, y>0\right.)]\right\} = \\ &= Log\ L_1 + Log\ L_2 \end{aligned} \tag{3}$$

The function of the log-likelihood reveals that the two parts of the model can be estimated separately. The two-part model is often estimated by combining a binary model for the count being zero or positive ($Log\ L_1$) and a truncated-at-zero count model for strictly positive outcomes ($Log\ L_2$) (Pohlmeier and Ulrich, 1995; Jones, 2003). In this study the data are pooled over the eight years of the survey and for the first stage of the decision process a logit model is used, and for the second stage a truncated negative binomial model of type 2 is used to model the frequency process conditional on the decision to visit the hospital. The errors are assumed to be independently and normally distributed. Studies show that relaxing the assumption of error independence would not necessarily constitute an improvement of the model (Winkelmann, 2004).

A random effects ordered probit is used to model the individual's visits to the doctor. The model is of the form:

$$\begin{aligned} y_{it}^{*} &= x_{it}^{'}\beta + \varepsilon_{it}, \qquad i = 1,...,n, t = 1,...8 \\ \varepsilon_{it} &= \nu_{it} + u_i \end{aligned} \tag{4}$$

where is y_{it} is the number of times that the *i*-th individual's has visited the of doctor y_{it}^{*} is the underlying latent variable. The relationship between the observed variable y_{it} and the latent variable y_{it}^{*} is as follows:

$$\begin{aligned} &y_{it} = 1 \ if \ y_{it}^{*} \le 0 \\ &y_{it} = 2 \ if \ 0 < y_{it}^{*} \le \mu_1 \\ &y_{it} = 3 \ if \ \mu_1 < y_{it}^{*} \le \mu_2 \\ &y_{it} = 4 \ if \ \mu_2 < y_{it}^{*} \le \mu_3 \\ &y_{it} = 5 \ if \ \mu_4 < y_{it}^{*} \end{aligned} \tag{5}$$

The cut points $\mu_j, j = 1,..., j-1$ are unknown parameters to be estimated along with the β s. Let x_{it} be a vector of the explanatory variables and ε_{it} is the error term which consists of a component ν_{it} which varies independently over time (*t*) and individuals

(i) and a component u_i which is the individual specific random effect, which also varies over individuals but it is constant over time. It is assumed that u_i is unrelated to the explanatory variables x_{it}.

3. Results

Individual Determinants of Inpatient Nights

Inpatient Nights and Employment Status

Table 3 reports the random effects negative binomial regressions results on the determinants of inpatient nights for the nine E.U. countries utilised in the study after controlling for individual's health status. Applied research indicates that the unemployed report higher levels of hospital admissions (Mathers and Schofield, 1998; Gravelle et al., 2003). Unemployment increases the demand for health care services through the increased health problems that unemployed individuals face compared to their employed counterparts (Harris et al., 1998). The present study confirms the literature regarding the increased health care utilisation rates of the unemployed. The effect is significant for five out of the nine countries examined (Belgium, Denmark, Greece, Netherlands, Portugal)[2]. Individuals in labour market inactivity report a higher number of inpatient nights compared to the employed labour force for all the E.U. countries utilised in the study with the exception of Belgium. This is in line with other studies (Schofield, 1996) which have documented that individuals out of the labour force have significantly higher rates of hospital use in comparison to the remaining groups of the workforce.

In contrast, the effect of income on the number of inpatient nights is not clear-cut. An income effect is observed only for Denmark, Italy, and Spain. In Denmark, an increase in the equivalised household income is associated with an increase in the expected number of inpatient nights. However, a non-linear concave relationship between income level and the number of inpatient nights is observed for Italy and Spain indicating that inpatient nights increase with income levels but at a decreasing rate.

[2] For the remaining countries this effect is insignificant. Ireland is a notable exception.

One of Grossman's (1972, 2003) predictions is that, under an inelastic demand curve, the more educated the individual is, the more health care and less medical care would demand. This study, however, does not seem to support the view that education increases the efficiency of health capital production. Educational level is positively correlated to the demand for health care. Thus, being in the highest educational class in Denmark, Greece, Ireland, Portugal, and UK is associated with an increase in the expected number of inpatient nights compared to individuals in the lowest educational class[3]. A positive relationship between being in the middle educational level and the number of inpatient nights is also observed for Greece, Ireland, the Netherlands, and Portugal.

Demographic characteristics are also found to affect the expected number of inpatient nights in many E.U. countries. In line with the literature, age is related with inpatient nights in a quadratic pattern, indicating that as age increases the expected number of inpatient nights decreases but the minimum varies from country to country[4], the expected number of inpatient nights increases along with age. This U-shaped pattern is consistent with a number of studies which use different approximations of health care (Cameron et al., 1998; Deb, 2001).

The gender effect on health care utilisation seems to exhibit a north – south divide. In Denmark, the Netherlands and the UK being a female is associated with a greater number of inpatient nights, but the reverse is the case for Greece, Italy, Portugal and Spain. One may surmise that environmental and institutional factors such as the prevalence of preventive medical examinations (such as cervical smear) under the health care systems in the northern European countries may account for this finding. Being married or divorced or widowed is associated with increased hospitalization rates.

Although the literature suggest that there is a positive effect of the extent of social networks on health care demand, this study fails to provide a clear cut evidence on

[3] A notable exception is Italy.
[4] For Belgium 45, Denmark 61, Greece 54, for Ireland 46, Italy 50, the Netherlands 54, Portugal 65, Spain 49 and the UK 57)

this. For Belgium, Italy, Netherlands belonging in social groups is beneficial leading to a decrease in utilization rates. In contrast, belonging in social groups is detrimental in the case of Italy and insignificant for the remaining countries.

As one would expect the individual's health is more important determinant of hospital admission rates than the demographic and SES indicators (Cameron et al., 1998). Indeed, reporting good or very good health status and absence of mental or physical health problems is associated with a lower number of inpatient nights. The finding is robust for all countries utilised in the study, and the pattern is consistent across all the regression models applied.

To perform sensitivity analysis for the above findings, the analysis is repeated using the two-part model which distinguishes between the two processes; namely the contact decision and the frequency. Tables 4 and 5 report the regression results for the decision stage and the frequency stage respectively. The literature suggests that household-level data are quite appropriate to quantify the determinants of the first stage decision. However due to lack of information on supply side factors, the determinants of the frequency decision suffer from unobserved heterogeneity (Pohlmeier and Ulrich, 1995). Hence, the results should be viewed under this caveat.

The results show that the first stage contact decision process is determined by the same factors as the factors identified by the random effects negative binomial model discussed above. Thus, the same SES and demographic characteristics that are found to significantly affect the number of inpatient nights seem to affect the decision to contact the hospital.

However, there are a number of issues arising when the frequency process is examined, namely when the determinants of inpatient nights conditional on the first visit are investigated.

Individual demographic and SES characteristics appear to be inadequate to explain a large part of utilisation rates. This implies that unobserved factors most probably medical results obtained upon the individual's contact with the hospital determine this process. However, some SES effects are still emerging. The effect of current

unemployment on the number of inpatients nights is retained in the case of Ireland and Spain. However, being currently out of labour force appears to be related positively with inpatient nights for six countries namely, Denmark, Ireland, Italy, Portugal, Spain and UK[5].

The effect of income on the number of inpatient nights is negative but the non-linearity is not consistent across countries. The effect of age on the duration of inpatient nights appears attenuated and reversed in the case of Denmark, Italy, and Portugal, whereas a convex relationship is still observed for UK. Reversed results are also shown regarding the gender and marital status indicators. In the countries that the relationship is significant, it indicates that being a female is associated with a decrease in the number of nights spent in hospital in comparison to males and so does being married, divorced, or widowed in comparison to single respondents.

Inpatient nights and hours of work

An issue which arises from the literature (Schofield, 1996; Dustmann and Windmeijer, 2000) and should be investigated is the proposition that the hours devoted to the labour market activity by the individual act as a substitute to health investing activities, namely to health care utilisation. According to this view the individual may demand less health care in order to free time and thus to participate longer in the labour market. Hence, longer work hours should be associated with less demand and utilisation of health care. To investigate this issue both the one stage and the two stage model (the contact decision stage and the frequency stage) are re-estimated after including in as explanatory variables the total hours of work per week reported by the individual. Tables 6-8 report the results for the above two methodologies respectively.

An individual working for more than 40 hours per week appears to have a lower expected number of inpatient nights compared to unemployed individuals. Hence, working for more than 40 hours per week is associated with a lower demand for health care services for all the E.U. countries investigated with the exception of Spain and Ireland. The effect appears to be reversed for Ireland. There are two possible

[5] This effect appears to be robust in the random effects negative binomial model, since it persists for all the countries except Belgium.

explanations for this finding; either the time devoted to labour market activities and time devoted to health investment are substitutes or that working overtime is correlated positively with good health and thus, the coefficient of the working overtime dummy variable on the number of inpatient nights is biased downwards. However, in this model two separate health status indicators are used to control for the effect of the individual's health status on demand for health. Hence, one would expect that the former explanation is more plausible. Similar conclusions can be derived from the second hours of work dummy variable namely, 30 to 40 hours per week. However, the result is robust for only four countries (Belgium, Denmark, the Netherlands and Portugal but again the effect appears to be reversed in that case of Ireland).

Interestingly, the pattern changes with respect to individuals working part time, namely less than 30 hours per week. The Greek and Portuguese members of the workforce who are employed part time report a lower number of inpatient nights in comparison to their unemployed counterparts. The Irish and Dutch part-time employees exhibit a greater number of inpatient nights in comparison to unemployed. Individuals out of the labour force in Denmark, Ireland, Spain, and the UK, are also found to spend more nights in hospital in comparison to unemployed[6].

Similar pattern is observed when the two-stage model is employed. In particular, individuals working overtime hours exhibit a lower likelihood of reporting an inpatient admission in comparison to their unemployed counterparts for Belgium, Denmark, Greece, Italy, Netherlands, Portugal, and UK. However, as was the case previously, when the frequency stage is modelled, individual characteristics are not adequate to explain the demand for health care. Yet, working more than 40 hours per week is associated with a decrease in the expected number of inpatient nights in comparison to the unemployed. In both processes, health status indicators are important contributors of individual demand for health care.

Individual determinants of visits to doctors

Doctor visits and employment status

[6] The effect of individual demographic and SES characteristics on the demand for health care does not appear to be affected by the introduction of the hours of work variables in the regression.

The visits to doctor indicator of the health care utilisation rates include many different dimensions of health care utilisation, ranging from visits to general practitioners to visits made for preventive reasons. Therefore, the existence of horizontal inequity is expected to be more evident than in the previous analysis.

Table 9 presents the estimation results from the random effects ordered probit regressions on the determinants of doctor utilisation rates. Employment status is found to be a strong determinant of the number of doctor visits. In seven out of the nine E.U. countries examined (Denmark, Greece, Ireland, Netherlands, Portugal, Spain, and UK) being unemployed is associated with an increased probability of visiting the doctor in comparison to the employed individuals. Similar findings are observed for the inactive (out of the labour force) individuals and the results are robust for all nine countries that are included in the study. The existing literature is in line with the findings of this study. Unemployment state is found repeatedly to be a determinant of general practitioners' utilisation rates, through its effect on psychological and physical health state (Harris et al., 1998; Mathers and Schofield, 1998; Ferrie et al., 2001). In addition, other studies reported a direct effect of unemployment of the GP utilisation rates, even after adjusting for the individual health status (Yuen and Balarajan, 1989).

Furthermore, a strong effect of income on the number of doctor visits is shown for all countries, with the exception of Ireland. In contrast to the literature findings that doctor utilisation rates are higher among low-income groups, the present study provides evidence of a positive relationship between income and doctor visits, indicating that the probability of visiting the doctor increases along with income. However, one should bare in mind that the dependent variable covers all types of doctor services including those for preventive reasons, for example visits to opticians or dentists which are known to be affected positively by income situation. Rundall and Wheeler (1979) use path analysis to estimate the indirect effects of income on health care utilisation and they argue that poorer individuals not only perceive themselves as being more resistant to illness but they also lack a "usual source" of medical care, therefore they are less reluctant to visit the doctor. Winkelmann (2004) also reported that income affected positively the expected number of doctor visits.

Furthermore, a non-linear concave relationship is observed for most countries (Belgium, Greece, Italy, Netherlands, Portugal, and Spain). A non-linear relationship between income and doctor visits is underlined in the literature, with the highest and the lowest income groups having the lower demand (Windmeijer and Santos Silva, 1997).

Educational level effects are found for Denmark, Greece, Ireland, Italy, Netherlands, and Portugal. Individuals with high or middle education have higher likelihood of visiting the doctor in comparison to individuals of the lowest educational level. In contrast, British respondents of higher and middle educational class have a lower likelihood of visiting the doctor in comparison to the remainder. The theory predicts a negative coefficient of the education effect on the demand for health care. Conventional wisdom suggests that higher education level is associated with fewer visits to general practitioners through better self-reported health assessed health status, better health and higher income (Fernández-Olano et al., 2005). In line with the above, Van der Heyden et al. (2003) shows that individuals of low SES, approximated by education and equivalised household income, make more frequent use of both general practitioner services and inpatient nights. However, the positive relationship between education and doctor utilisation rates may capture the effect of unobserved factors, such as the private health insurance coverage or even the influence of health-related perceptions and preferences of the individual.

The results show a non-linear U- shaped relationship between age and doctor utilisation rates. Thus, as age increases demand for health care decreases up to certain age after which doctor utilisation rates begin to increase along with age increases. This age appear to be very different among countries (For Belgium is 41, Demark 53, Ireland 45, the Netherlands 60, Portugal 76, Spain 14 and the UK 50 years of age)

Being a female is associated with higher likelihood of visiting the doctor for all nine E.U. countries, in line with the literature (Schofield, 1996; Windmeijer and Santos Silva, 1997; Winkelmann, 2004).

Further, there is a positive relationship between marital status and doctor visits for all countries with the exception of Denmark. Married, divorced or widowed individuals

have higher probability of visiting the doctor in comparison to their single counterparts. Other studies have also documented a positive relationship between marital status and doctor visits (Winkelmann, 2004).

The results show that being a member in any kind of social club increases the probability of visiting the doctor in Greece, Italy, Netherlands, Portugal, Spain, and UK. This implies that the effect of the social support on the demand of health care as measured by visits to the doctor is significant. Similarly, Coulton and Frost (1982) found a negative relationship between social isolation and health care utilisation in a sample of elderly individuals. They argue that the decreased health care demand of socially isolated individuals may reflect their weaker ties with the community as a whole.

As one would expect individual health status is the most important determinant of the number of visits to the doctor. Thus, assessing positively own health state and reporting absence of specific mental and physical health problems decreases the probability of visiting the doctor.

Doctor visits and employment status

Doctor visits and hours of work

Table 10 reports the results from the random-effects ordered probit regressions on the effects of hours of work on the number of doctor visits. The main findings regarding the effect of demographic and SES indicators on demand for health remain the same. Working more than 40 hours per week is associated negatively with the number of visits to the doctor. Individuals who work over-time or are employed working 30 to 40 hours per week report lower number of visits to the doctor compared to unemployed individuals, even after controlling for individual health status (with the exception of Belgium and Italy in the former case and Belgium, Italy, and the UK in the latter). However, the effect of working part-time on the demand for health care is relatively weak. For Greece, Portugal, and the UK working part-time is associated with a lower likelihood of visiting the doctor compared to the unemployed but with higher likelihood for Belgium and Italy. In contrast, being out of the labour force increases the likelihood of visiting the doctor for Belgium, Ireland, Italy, Portugal,

and Spain but it decreases the likelihood for the Netherlands. In general the above findings support Schofield (1996) who provides evidence that the unemployed used significantly more doctor services than those who worked 40 hours or more and about the same number with individuals working for less than 40 hours. Schofield (1996) argued that time limits faced by individuals working long hours are the main reason for them in being reluctant to visit the doctor even when they are ill. Individuals out of the labour force are found to exhibit higher rates of hospital admission than the remainder. The unemployed and individuals and those working fewer than 20 hours per week are found to be the next most frequently admitted group.

4. Conclusions

This paper investigates the SES determinants of the individual demand for health care in nine E.U. countries. Evidence of horizontal inequity based on employment status, education, and equivalised household income appear to be important in all countries in the study. However, the findings differ among countries indicating the existence of unobserved institutional and environmental factors that affect demand for health care at the country level.

All in all, the most important determinants of health care utilisation appear to be variables approximating the need for these services. However, the unemployed and individuals out of the labour force are found to report increased number of inpatient nights and visits to doctors implying a SES –demand for health care link. Furthermore, hours of work seem to have an independent effect on the demand for health care in the E.U. countries, even after controlling for health status. Thus, individuals working overtime exhibit a lower number of inpatient nights and they have a lower likelihood of visiting the doctor in comparison to their unemployed counterparts. It seems that there is a significant 'trade off' between time engaged in labour market activities and time devoted to health care services.

When the two processes of health care utilisation, the decision and the frequency process, are treated separately it seems that individual characteristics are inadequate explaining the second stage of health care demand. This finding verifies the findings of the existing literature that the frequency process is largely driven by supply factors

or medical condition. However, individual SES characteristics still account for differences in health care patterns encountered in the first stage of the decision process.

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Table 1. Definitions of the Variables

Variables	***Definitions***
Inpatient nights	Number of nights spent in hospital during the past 12 months
Yes inpatient nights	Dummy equal to 1 if the respondent has at least 1 night spent in hospital the past 12 months, 0 otherwise
Doctor visits	Number of times the person has been to a doctor or a dentist or optician, during the past 12 months (1: not at all, 2: 1-2 times, 3: 3-5 times, 4: 6-9 times, 5: 10 times or more)
Yes doctor visits	Dummy equal to 1 if the respondent has been to a doctor/dentist/optician at least 1 time the past 12 months, 0 otherwise
Age	Age in years (divided by 100)
Age^2	Age squared
Female	Dummy equal to 1 if the respondent is a female, 0 otherwise
Married	Dummy equal to 1 if the respondent is married, 0 otherwise
Divorced/ widowed	Dummy equal to 1 if the respondent is either separated/divorced or widowed (for Netherlands separated individuals are included in the "Married" dummy), 0 otherwise
Social networks	Dummy equal to 1 if the respondent is member in any social club, such as sports or entertainment club, a local or neighbourhood group, a party, etc., 0 otherwise
Social networks (missing)	Dummy equal to 1 if the respondent did not answer the above question about social networks (only for UK), 0 otherwise
High education	Dummy equal to 1 if the respondent is of higher level education, 0 otherwise
Middle education	Dummy equal to 1 if the respondent is of middle level education, 0 otherwise
Unemployed	Dummy equal to 1 if the respondent is unemployed, 0 otherwise
Inactive	Dummy equal to 1 if the respondent is out of the labour force (inactivity is defined by: working in apprenticeship, working for training, working in unpaid work, being in education, being retired, working less than 15 hours/week), 0 otherwise
Hours of work 30-	Dummy equal to 1 if the respondent is working for less than 30 hours per week, in both main and additional jobs, 0 otherwise
Hours of work 30-40	Dummy equal to 1 if the respondent is working between 30 to 40 hours per week, in both main and additional jobs, 0 otherwise
Hours of work 40+	Dummy equal to 1 if the respondent is working for more than 40 hours per week, in both main and additional jobs, 0 otherwise
Income	Equivalised household income (divided by 100,000 for Belgium, Denmark, Greece, Portugal, and Spain, by 1,000 for Ireland, and the Netherlands, and by 10,000 for Italy, and UK)
$Income^2$	Equivalised household income squared
Good SAHS	Dummy equal to 1 if the respondent evaluates his/her general health status very good/ good, 0 otherwise
No health problems	The individual reports no health problems

Notes: Year dummies are included in the analysis, with the year dummy for 1994 omitted from the regressions.
Regional dummies are available for all countries except for Denmark and the Netherlands.
Omitted categories in all regressions: Single, low or no education, employed, less than 30 hours.

Table 2. Means of the Variables

Means / *Variables*	**Belgium**	**Denmark**	**Greece**	**Ireland**	**Italy**	**Netherlands**	**Portugal**	**Spain**	**UK**
Inpatient nights	1.05	0.99	0.72	1.04	0.96	0.80	0.66	0.94	0.61
Yes inpatient	0.10	0.09	0.06	0.10	0.08	0.08	0.05	0.08	0.09
Doctor visits	3.46	3.09	2.59	1.77	2.05	2.06	1.84	1.40	2.32
Yes doctor visits	0.94	0.95	0.71	0.82	0.84	0.92	0.79	0.83	0.97
Age	48.95	48.05	50.27	48.89	47.14	45.87	50.45	49.97	48.02
Female	0.54	0.52	0.53	0.52	0.52	0.53	0.54	0.55	0.55
Married	0.70	0.63	0.77	0.71	0.68	0.70	0.71	0.70	0.66
Divorced/ widowed	0.16	0.16	0.10	0.10	0.09	0.12	0.13	0.11	0.17
Social networks	0.42	0.66	0.10	0.46	0.20	0.45	0.17	0.28	0.63
High education	0.31	0.31	0.12	0.14	0.07	0.17	0.04	0.15	0.39
Middle education	0.31	0.43	0.23	0.32	0.32	0.59	0.08	0.14	0.13
Unemployed	0.05	0.05	0.04	0.05	0.07	0.08	0.03	0.07	0.02
Inactive	0.39	0.29	0.47	0.44	0.49	0.38	0.42	0.53	0.37
Hours of work 30-	0.09	0.08	0.07	0.11	0.06	0.11	0.05	0.04	0.12
Hours of work 30-40	0.28	0.43	0.22	0.22	0.24	0.31	0.27	0.21	0.22
Hours of work 40+	0.19	0.16	0.20	0.18	0.15	0.11	0.23	0.15	0.28
Income	46866.17	11498.55	164090	730.80	1451.57	2241.20	83756.02	114456.3	990.64
Good SAHS	0.75	0.78	0.74	0.81	0.59	0.44	0.41	0.63	0.72
No health problems	0.84	0.79	0.84	0.84	0.87	0.41	0.74	0.82	0.90
Observations	15944	18280	39368	17760	62096	26460	51672	55856	39640

Notes: Year dummies are included in the analysis, with the year dummy for 1994 omitted from the regressions.
Regional dummies are available for all countries except for Denmark and the Netherlands.

Table 3. Number of Nights Spent in Hospital and Employment Status

Dependent Variable / *Independent Variables*	***Number of Inpatient Nights, Random Effects Negative Binomial Regressions***								
	Belgium	**Denmark**	**Greece**	**Ireland**	**Italy**	**Netherlands**	**Portugal**	**Spain**	**UK**
Age	-2.81 ***	-7.90 ***	-1.66 *	-3.51 ***	-3.84 ***	-8.31 ***	-3.30 ***	-3.13 ***	-10.03 ***
Age^2	3.09 ***	6.52 ***	1.53 *	3.83 ***	3.87 ***	7.74 ***	2.55 ***	3.18 ***	8.77 ***
Female	0.04	0.12 **	-0.20 ***	0.04	-0.06 *	0.17 ***	-0.24 ***	-0.21 ***	0.40 ***
Married	0.16 *	0.34 ***	0.65 ***	0.37 ***	0.40 ***	0.54 ***	0.46 ***	0.38 ***	0.44 ***
Divorced/ widowed	0.31 ***	0.47 ***	0.61 ***	0.15	0.32 ***	0.57 ***	0.41 ***	0.40 ***	0.31 ***
Social networks	-0.12 **	0.03	0.11	0.05	0.17 ***	-0.08 *	0.03	0.05	-0.04
High education	-0.05	0.16 **	0.20 **	0.24 ***	-0.35 ***	0.12	0.33 ***	0.01	0.09 **
Middle education	0.002	0.08	0.15 **	0.11 *	-0.01	0.16 ***	0.22 **	-0.01	-0.02
Unemployed	0.23 **	0.26 **	0.20 *	-0.35 **	0.06	0.15 *	0.29 ***	0.003	0.15
Inactive	0.12	0.63 ***	0.20 ***	0.24 ***	0.09 **	0.22 ***	0.36 ***	0.16 ***	0.48 ***
Income	0.21	2.76 **	-0.04	0.01	1.23 ***	0.06	0.03	0.16 ***	0.80
$Income^2$	-0.09	-2.90	0.003	0.02	-2.21 ***	-0.02	-0.003	-0.03 ***	-1.22
Good SAHS	-0.88 ***	-0.94 ***	-1.46 ***	-1.10 ***	-0.84 ***	-0.82 ***	-1.15 ***	-0.89 ***	-0.94 ***
No health problems	-0.42 ***	-0.33 ***	-0.93 ***	-0.64 ***	-1.05 ***	-0.62 ***	-0.92 ***	-0.61 ***	-0.40 ***
Constant	-2.15 ***	-1.12 ***	-2.48 ***	-2.20 ***	-2.52 ***	-1.55 ***	-3.70 ***	-2.73 ***	-0.54 ***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Wald χ^2	717.63	786.04	2732.08	1314.43	3434.02	1153.01	1614.65	2288.76	1743.56
Log-Likelihood	-10222.63	-10471.96	-16210.47	-11054.54	-32271.74	-13402.45	-18587.76	-30121.88	-20675.48
Observations	15944	18280	39368	17760	62096	26460	51672	55856	39640

Notes: *** significance at 1%, ** significance at 5%, * significance at 10% respectively.
Year dummies are included in the analysis, with the year dummy for 1994 omitted from the regressions.
Regional dummies are available for all countries except for Denmark and the Netherlands.

Table 4. Number of Nights Spent in Hospital and Employment Status, Decision Process

Dependent Variable / *Independent Variables*	*Yes Inpatient Nights, Logit Regressions*								
	Belgium	**Denmark**	**Greece**	**Ireland**	**Italy**	**Netherlands**	**Portugal**	**Spain**	**UK**
Age	-2.92 ***	-8.14 ***	-1.74 *	-4.17 ***	-4.30 ***	-9.12 ***	-3.45 ***	-3.38 ***	-10.67 ***
Age^2	3.24 ***	6.74 ***	1.65 *	4.54 ***	4.32 ***	8.50 ***	2.69 ***	3.43 ***	9.37 ***
Female	0.05	0.13 **	-0.20 ***	0.05	-0.06	0.20 ***	-0.24 ***	-0.21 ***	0.42 ***
Married	0.17 *	0.36 ***	0.68 ***	0.41 ***	0.43 ***	0.58 ***	0.47 ***	0.40 ***	0.46 ***
Divorced/ widowed	0.32 ***	0.49 ***	0.63 ***	0.14	0.34 ***	0.60 ***	0.41 ***	0.42 ***	0.32 ***
Social networks	-0.12 **	0.03	0.12	0.06	0.20 ***	-0.08 *	0.04	0.05	-0.04
High education	-0.04	0.15 *	0.21 **	0.23 **	-0.36 ***	0.14	0.33 ***	0.01	0.10 **
Middle education	0.01	0.07	0.16 **	0.11 *	-0.01	0.18 ***	0.23 ***	-0.01	-0.02
Unemployed	0.26 **	0.29 **	0.22 *	-0.37 **	0.06	0.15 *	0.29 ***	0.01	0.15
Inactive	0.11	0.66 ***	0.20 ***	0.25 ***	0.09 **	0.20 ***	0.37 ***	0.16 ***	0.50 ***
Income	0.21	3.03 **	-0.03	0.03	1.28 ***	0.07	0.04	0.17 ***	0.81
$Income^2$	-0.09	-3.30	0.002	0.02	-2.27 ***	-0.02	-0.003	-0.04 ***	-1.12
Good SAHS	-0.92 ***	-0.99 ***	-1.50 ***	-1.16 ***	-0.86 ***	-0.85 ***	-1.16 ***	-0.90 ***	-0.98 ***
No health problems	-0.46 ***	-0.38 ***	-0.98 ***	-0.69 ***	-1.10 ***	-0.65 ***	-0.95 ***	-0.64 ***	-0.45 ***
Constant	-0.96 ***	0.005	-1.14 ***	-0.88 ***	-1.09 ***	-0.14	2.34 ***	-1.44 ***	0.61 ***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
LR χ^2	667.94	816.77	2860.51	1154.08	3133.98	1060.51	1894.42	2247.89	1723.67
Log-Likelihood	-4972.41	-5295.49	-7652.72	-5240.25	-15171.67	-6792.62	-9352.83	-14674.35	-10996.98
Observations	15944	18280	39368	17760	62096	26460	51672	55856	39640

Notes: *** significance at 1%, ** significance at 5%, * significance at 10% respectively.
Year dummies are included in the analysis, with the year dummy for 1994 omitted from the regressions.
Regional dummies are available for all countries except for Denmark and the Netherlands.

Table 5. Number of Nights Spent in Hospital and Employment Status, Frequency Process

Dependent Variable / *Independent Variables*	*Inpatient Nights, Truncated Negative Binomial Regressions*								
	Belgium	**Denmark**	**Greece**	**Ireland**	**Italy**	**Netherlands**	**Portugal**	**Spain**	**UK**
Age	0.95	6.92 ***	1.41	-1.41	2.22 ***	2.24 *	2.54 **	-0.22	-2.03 **
Age^2	0.39	-5.07 ***	-1.08	2.39 **	-1.92 ***	-0.90	-2.51 **	1.18 *	3.51 ***
Female	0.05	-0.11	-0.03	-0.08	-0.12 ***	-0.21 ***	-0.36 ***	-0.23 ***	-0.08
Married	-0.54 ***	-0.46 ***	-0.40 ***	-0.12	-0.11 **	-0.17 *	-0.20 **	-0.33 ***	0.04
Divorced/ widowed	-0.09	-0.64 ***	-0.37 ***	-0.11	0.02	-0.05	-0.12	-0.25 ***	0.18 **
Social networks	-0.08	0.06	-0.20 **	-0.08	-0.18 ***	-0.07	-0.12	-0.02	-0.06
High education	-0.27 ***	-0.05	-0.38 ***	0.09	-0.12	-0.08	0.12	-0.02	-0.01
Middle education	0.01	0.05	-0.01	0.13 *	-0.05	0.003	0.07	-0.07	-0.08
Unemployed	-0.14	0.02	0.06	0.52 ***	0.03	0.13	-0.04	-0.22 **	0.14
Inactive	-0.05	0.45 ***	-0.02	0.21 ***	0.14 ***	0.13	0.22 ***	0.19 ***	0.11 **
Income	-2.01 ***	-1.64	-0.01	-0.04	-0.39	-0.34 **	-0.40 ***	-0.15 **	-0.07
$Income^2$	0.94 ***	0.25	-0.003	0.001	-0.10	0.06 **	0.04 ***	0.01	-0.77
Good SAHS	-0.31 ***	-0.52 ***	-0.32 ***	-0.45 ***	-0.31 ***	-0.43 ***	-0.13	-0.49 ***	-0.61 ***
No health problems	-0.16 **	-0.44 ***	-0.24 ***	-0.43 ***	-0.32 ***	-0.435 ***	-0.46 ***	-0.27 ***	-0.28 ***
Constant	2.70 ***	-0.02	2.53 ***	2.23 ***	2.28 ***	2.06 ***	2.53 ***	2.74 ***	2.19 ***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
LR χ^2	299.81	227.88	193.64	289.76	525.36	268.20	237.90	710.81	707.45
Log-Likelihood	-5120.00	-5162.58	-8165.14	-5652.79	-16251.50	-6474.28	-8958.77	-14928.37	-9403.70
Observations	1651	1721	2416	1796	4736	2095	2598	4562	3510

Notes: *** significance at 1%, ** significance at 5%, * significance at 10% respectively.
Year dummies are included in the analysis, with the year dummy for 1994 omitted from the regressions.
Regional dummies are available for all countries except for Denmark and the Netherlands.

Table 6. Number of Nights Spent in Hospital and Hours of Work

Dependent Variable / *Independent Variables*	*Number of Inpatient Nights, Random Effects Negative Binomial Regressions*								
	Belgium	**Denmark**	**Greece**	**Ireland**	**Italy**	**Netherlands**	**Portugal**	**Spain**	**UK**
Age	-2.78 ***	-7.85 ***	-1.59 *	-3.55 ***	-3.84 ***	-8.23 ***	-3.30 ***	-3.13 ***	-10.12 ***
Age^2	3.06 ***	6.46 ***	1.49 *	3.87 ***	3.86 ***	7.58 ***	2.56 ***	3.18 ***	8.81 ***
Female	0.02	0.10 **	-0.20 ***	0.05	-0.07 **	0.03	-0.24 ***	-0.21 ***	0.33 ***
Married	0.15 *	0.34 ***	0.65 ***	0.37 ***	0.40 ***	0.52 ***	0.46 ***	0.38 ***	0.43 ***
Divorced/ widowed	0.31 ***	0.48 ***	0.61 ***	0.15	0.33 ***	0.58 ***	0.41 ***	0.40 ***	0.31 ***
Social networks	-0.12 **	0.03	0.11	0.05	0.17 ***	-0.08 *	0.03	0.05	-0.04
High education	-0.05	0.16 **	0.20 **	0.24 ***	-0.37 ***	0.12	0.33 **	0.01	0.10 **
Middle education	0.002	0.07	0.14 **	0.11 *	-0.03	0.15 ***	0.22 **	-0.01	-0.02
Hours of work 30-	-0.14	-0.24	-0.32 **	0.32 *	0.03	0.17 *	-0.28 *	0.05	0.05
Hours of work 30-40	-0.27 **	-0.22 *	-0.11	0.32 **	-0.004	-0.27 ***	-0.25 **	0.001	-0.13
Hours of work 40+	-0.24 *	-0.46 ***	-0.26 **	0.39 **	-0.20 **	-0.69 ***	-0.32 ***	-0.03	-0.29 **
Inactive	-0.11	0.36 ***	-0.01	0.59 ***	0.03	0.07	0.08	0.16 **	0.37 ***
Income	0.23	2.98 ***	-0.04	0.02	1.23 ***	0.05	0.03	0.16 ***	1.12
$Income^2$	-0.10	-3.11	0.003	0.02	-2.16 ***	-0.01	-0.003	-0.03 ***	-1.69
Good SAHS	-0.88 ***	-0.94 ***	-1.47 ***	-1.10 ***	-0.84 ***	-0.81 ***	-1.15 ***	-0.88 ***	-0.94 ***
No health problems	-0.42 ***	-0.33 ***	-0.93 ***	-0.64 ***	-1.05 ***	-0.60 ***	-0.92 ***	-0.61 ***	-0.41 ***
Constant	-1.91 ***	-0.87 ***	-2.29 ***	-2.54 ***	-2.45 ***	-1.29 ***	-3.41 ***	-2.72 ***	-0.34 *
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Wald χ^2	718.01	788.88	2734.92	1314.82	3442.54	1170.65	1615.78	2289.60	1751.67
Log-Likelihood	-10221.95	-10468.61	-16208.07	-11054.22	-32265.12	-13375.59	-18587.31	-30121.59	-20663.71
Observations	15944	18280	39368	17760	62096	26460	51672	55856	39640

*Notes: *** significance at 1%, ** significance at 5%, * significance at 10% respectively.
Year dummies are included in the analysis, with the year dummy for 1994 omitted from the regressions.
Regional dummies are available for all countries except for Denmark and the Netherlands.

Table 7. Number of Nights Spent in Hospital and Hours of Work, Decision Process

Dependent Variable / *Independent Variables*	*Yes Inpatient Nights, Logit Regressions*								
	Belgium	**Denmark**	**Greece**	**Ireland**	**Italy**	**Netherlands**	**Portugal**	**Spain**	**UK**
Age	-2.89 ***	-8.09 ***	-1.69 *	-4.20 ***	-4.31 ***	-9.01 ***	-3.46 ***	-3.38 ***	-10.77 ***
Age^2	3.21 ***	6.69 ***	1.62 **	4.57 ***	4.31 ***	8.30 ***	2.69 ***	3.42 ***	9.40 ***
Female	0.03	0.11 *	-0.20 ***	0.05	-0.07 **	0.05	-0.25	-0.21 ***	0.35 ***
Married	0.16	0.36 ***	0.68 ***	0.41 ***	0.43 ***	0.56 ***	0.47 ***	0.40 ***	0.45 ***
Divorced/ widowed	0.32 ***	0.50 ***	0.63 ***	0.14	0.35 ***	0.61 ***	0.41 ***	0.42 ***	0.33 ***
Social networks	-0.12 **	0.03	0.13	0.06	0.20 ***	-0.08 *	0.04	0.05	-0.04
High education	-0.05	0.15 *	0.22 **	0.23 **	-0.38 ***	0.14	0.33 **	0.004	0.11 **
Middle education	0.01	0.06	0.16 **	0.11 *	-0.03	0.17 ***	0.22 **	-0.02	-0.02
Hours of work 30-	-0.16	-0.26 *	-0.34 **	0.36 **	0.03	0.18 *	-0.29 *	0.04	0.07
Hours of work 30-40	-0.30 **	-0.25 **	-0.13	0.35 **	-0.001	-0.28 ***	-0.26 **	-0.01	-0.13
Hours of work 40+	-0.27 **	-0.50 ***	-0.27 *	0.40 **	-0.20 **	-0.70 ***	-0.33 ***	-0.04	-0.28 **
Inactive	-0.14	0.37 ***	-0.03	0.62 ***	0.03	0.05	0.08	0.15 *	0.39 ***
Income	0.23	3.27 ***	-0.03	0.04	1.28 ***	0.05	0.04	0.17 ***	1.14
$Income^2$	-0.10	-3.52	0.003	0.02	-2.22 ***	-0.01	-0.003	-0.04 ***	-1.59
Good SAHS	-0.92 ***	-0.99 ***	-1.50 ***	-1.16 ***	-0.85 ***	-0.84 ***	-1.16 ***	-0.90 ***	-0.98 ***
No health problems	-0.45 ***	-0.37 ***	-0.98 ***	-0.69 ***	-1.10 ***	-0.63 ***	-0.95 ***	-0.64 ***	-0.45 ***
Constant	-0.69 **	-0.29	-0.93 ***	-1.24 ***	-1.03 ***	0.14	-2.04 ***	-1.42 ***	0.80 ***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
LR χ^2	669.42	823.60	2864.26	1154.41	3147.31	1112.54	1895.39	2248.57	1745.61
Log-Likelihood	-4971.67	-5292.07	-7650.84	-5240.09	-15165.01	-6766.60	-9352.34	-14674.01	-10986.02
Observations	15944	18280	39368	17760	62096	26460	51672	55856	39640

Notes: *** significance at 1%, ** significance at 5%, * significance at 10% respectively.
Year dummies are included in the analysis, with the year dummy for 1994 omitted from the regressions.
Regional dummies are available for all countries except for Denmark and the Netherlands.

Table 8. Number of Nights Spent in Hospital and Hours of Work, Frequency Process

Dependent Variable / *Independent Variables*	*Inpatient Nights, Truncated Negative Binomial Regressions*								
	Belgium	**Denmark**	**Greece**	**Ireland**	**Italy**	**Netherlands**	**Portugal**	**Spain**	**UK**
Age	0.94	6.74 ***	1.45	-1.52	2.20 ***	2.30 *	2.52 **	-0.25	-1.87 **
Age^2	0.41	-4.97 ***	-1.10	2.51 **	-1.89 ***	-0.95	-2.50 **	1.21 *	3.35 ***
Female	0.03	-0.16 *	-0.03	-0.04	-0.10 ***	-0.21 ***	-0.37 ***	-0.22 ***	-0.11 **
Married	-0.54 ***	-0.43 ***	-0.41 ***	-0.11	-0.11 **	-0.16	-0.20 **	-0.34 ***	0.04
Divorced/ widowed	-0.10	-0.61 ***	-0.38 ***	-0.10	0.02	-0.04	-0.12	-0.25 ***	0.19 **
Social networks	-0.07	0.05	-0.21 ***	-0.09	-0.18 ***	-0.08	-0.12	-0.02	-0.06
High education	-0.26 ***	-0.05	-0.35 ***	0.13	-0.09	-0.05	0.12	-0.01	0.001
Middle education	0.01	0.05	-0.01	0.14 *	-0.04	0.01	0.06	-0.06	-0.07
Hours of work 30-	0.24	0.05	-0.33 **	-0.72 ***	-0.21 *	-0.16	0.12	0.14	-0.09
Hours of work 30-40	0.16	0.05	0.04	-0.55 ***	-0.01	-0.04	0.03	0.19 **	-0.06
Hours of work 40+	0.004	-0.41 *	-0.11	-0.41 **	0.03	-0.49 ***	0.03	0.29 ***	-0.27
Inactive	0.08	0.44 **	-0.09	-0.34 *	0.11	0.003	0.26 *	0.41 ***	-0.03
Income	-1.97 ***	-1.10	-0.01	-0.06	-0.43	-0.37 **	-0.40 ***	-0.15 **	0.04
$Income^2$	0.92 ***	-0.38	-0.003	0.002	-0.10	0.06 **	0.04 ***	0.01	-1.03
Good SAHS	-0.31 ***	-0.53 ***	-0.33 ***	-0.44 ***	-0.31 ***	-0.41 ***	-0.13	-0.49 ***	-0.61 ***
No health problems	-0.15 **	-0.44 ***	-0.24 ***	-0.43 ***	-0.32 ***	-0.44 ***	-0.45 ***	-0.27 ***	-0.28 ***
Constant	2.56 ***	0.05	2.60 ***	2.78 ***	2.30 ***	2.20 ***	2.49 ***	2.53 ***	2.31 ***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
LR χ^2	302.49	234.68	201.81	294.31	532.41	274.84	238.40	712.97	714.47
Log-Likelihood	-5118.66	-5159.18	-8161.06	-5650.52	-16247.97	-6470.96	-8958.52	-14927.30	-9400.19
Observations	1651	1721	2416	1796	4736	2095	2598	4562	3510

Notes: *** significance at 1%, ** significance at 5%, * significance at 10% respectively.
Year dummies are included in the analysis, with the year dummy for 1994 omitted from the regressions.
Regional dummies are available for all countries except for Denmark and the Netherlands.

Table 9. Doctor Visits and Employment Status

Dependent Variable / *Independent Variables*	***Doctor Visits, Random Effects Ordered Probit Regressions***								
	Belgium	**Denmark**	**Greece**	**Ireland**	**Italy**	**Netherlands**	**Portugal**	**Spain**	**UK**
Age	-5.26 ***	-3.07 ***	1.06 ***	-4.74 ***	-0.10	-4.08 ***	2.49 ***	0.18 ***	-4.23 ***
Age^2	6.38 ***	2.91 ***	0.37	5.22 ***	1.41 ***	3.40 ***	-1.64 ***	0.64 **	4.27 ***
Female	0.53 ***	0.53 ***	0.28 ***	0.35 ***	0.43 ***	0.45 ***	0.54 ***	0.37 ***	0.42 ***
Married	0.19 ***	-0.005	0.26 ***	0.30 ***	0.16 ***	0.28 ***	0.24 ***	0.12 ***	0.08 ***
Divorced/ widowed	0.19 **	0.02	0.18 ***	0.36 ***	0.21 ***	0.33 ***	0.17 ***	0.09 ***	0.07
Social networks	0.03	0.03	0.15 ***	0.02	0.11 ***	0.05 ***	0.10 ***	0.08 ***	0.03 *
High education	-0.03	0.09 **	0.04	0.11 **	-0.03	0.21 ***	0.30 ***	0.02	-0.06 ***
Middle education	0.03	0.11 ***	0.05 **	0.01	0.03 *	0.18 ***	0.15 ***	0.01	-0.04 *
Unemployed	-0.10	0.12 ***	0.12 ***	0.14 ***	-0.02	0.11 ***	0.17 ***	0.07 ***	0.10 **
Inactive	0.09 **	0.19 ***	0.17 ***	0.22 ***	0.10 ***	0.05 *	0.22 ***	0.22 ***	0.13 ***
Income	0.35 **	1.47 ***	0.09 ***	0.06	0.38 ***	0.10 ***	0.14 ***	0.06 ***	-0.60 **
$Income^2$	-0.18 **	-1.36	-0.01 ***	-0.004	-0.39 **	-0.01 ***	-0.01 **	-0.01 *	0.78
Good SAHS	-0.67 ***	-0.47 ***	-0.84 ***	-0.73 ***	-0.44 ***	-0.77 ***	-0.64 ***	-0.57 ***	-0.79 ***
No health problems	-0.56 ***	-0.44 ***	-0.63 ***	-0.74 ***	-0.80 ***	-0.62 ***	-0.70 ***	-0.53 ***	-0.40 ***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
LR χ^2	1721.11	1148.34	7579.03	2209.93	10463.46	4026.34	8742.93	5818.41	14999.19
Log-Likelihood	-19770.85	-22904.25	-52874.90	-23396.69	-84467.51	-35048.95	-67709.14	-77993.48	-41908.58
Observations	15944	18280	39368	17760	62096	26460	51672	55856	39640

Note: *** significance at 1%, ** significance at 5%, * significance at 10% respectively.
Year dummies are included in the analysis, with the year dummy for 1994 omitted from the regressions.
Regional dummies are available for all countries except for Denmark and the Netherlands.

Table 10. Doctor Visits and Hours of Work

Dependent Variable / *Independent Variables*	*Doctor Visits, Random Effects Ordered Probit Regressions*								
	Belgium	**Denmark**	**Greece**	**Ireland**	**Italy**	**Netherlands**	**Portugal**	**Spain**	**UK**
Age	-5.24 ***	-3.02 ***	1.06 ***	-4.72 ***	-0.09	-4.00 ***	2.43 ***	0.19	-4.23 ***
Age^2	6.36 ***	2.83 ***	0.36	5.17 ***	1.41 ***	3.30 ***	-1.60 ***	0.62 *	4.24 ***
Female	0.52 ***	0.51 ***	0.28 ***	0.32 ***	0.42 ***	0.42 ***	0.53 ***	0.36 ***	0.40 ***
Married	0.19 ***	-0.01	0.26 ***	0.29 ***	0.16 ***	0.29 ***	0.24 ***	0.12 ***	0.08 ***
Divorced/ widowed	0.18 **	0.03	0.18 ***	0.36 ***	0.22 ***	0.33 ***	0.17 ***	0.09 ***	0.07 *
Social networks	0.03	0.03	0.15 ***	0.02	0.11 ***	0.05 ***	0.10 ***	0.08 ***	0.03 *
High education	-0.02	0.09 **	0.03	0.11 **	-0.03	0.22 ***	0.29 ***	0.02	-0.06 ***
Middle education	0.03	0.11 ***	0.05 **	0.01	0.03 *	0.18 ***	0.14 ***	0.01	-0.04
Hours of work 30-	0.13 *	-0.03	-0.10 **	-0.07	0.07 **	-0.06	-0.10 **	-0.01	-0.07 **
Hours of work 30-40	0.10	-0.13 ***	-0.10 ***	-0.15 ***	0.01	-0.11 **	-0.14 ***	-0.07 ***	-0.07
Hours of work 40+	0.06	-0.20 ***	-0.16 ***	-0.20 ***	-0.0004	-0.25 ***	-0.22 ***	-0.10 ***	-0.15 ***
Inactive	0.19 ***	0.08	0.05	0.10 *	0.12 ***	-0.06 *	0.06 *	0.15 ***	0.03
Income	0.37 **	1.63 ***	0.09 ***	0.06	0.45 ***	0.10 ***	0.14 ***	0.06 ***	-0.54 *
$Income^2$	-0.19 **	-1.58	-0.01 ***	-0.005	-0.45 **	-0.01 **	-0.01 **	-0.01	0.70
Good SAHS	-0.67 ***	-0.47 ***	-0.84 ***	-0.73 ***	-0.44 ***	-0.76 ***	-0.64 ***	-0.57 ***	-0.79 ***
No health problems	-0.56 ***	-0.44 ***	-0.63 ***	-0.74 ***	-0.80 ***	-0.62 ***	-0.70 ***	-0.53 ***	-0.40 ***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
LR χ^2	1723.03	1159.56	7588.52	2217.06	10456.91	4048.59	8767.89	5826.24	15014.40
Log-Likelihood	-19769.88	-22898.64	-52870.15	-23393.13	-84464.10	-35037.83	-67696.67	-77989.56	-41900.98
Observations	15944	18280	39368	17760	62096	26460	51672	55856	39640

Notes: *** significance at 1%, ** significance at 5%, * significance at 10% respectively.
Year dummies are included in the analysis, with the year dummy for 1994 omitted from the regressions.
Regional dummies are available for all countries except for Denmark and the Netherlands.